1.0 PURPOSE AND NEED

1.1 Introduction

The U.S. Department of Energy (DOE), National Nuclear Security Administration, is issuing this special environmental analysis (SEA) to document its assessment of impacts associated with emergency activities conducted at Los Alamos National Laboratory (LANL), Los Alamos County, New Mexico (Figure 1.1), in response to major disaster conditions caused by the recent wildfire known as the Cerro Grande Fire. This wildfire burned about 7,650[1] acres (ac) (3,061 hectares [ha]) within the boundaries of LANL and about an additional 35,500 ac (14,200 ha) in neighboring areas (Figure 1.2). DOE's emergency response to the threat of this fire began with certain preventative actions undertaken immediately before the wildfire entered LANL boundaries in early May 2000. DOE's subsequent actions include those taken to suppress the fire while it burned within LANL boundaries, as well as post-fire activities taken to address the extreme potential for erosion and flood damage at LANL and properties downstream from the facility.

1.1.1 Need for Agency Action

A number of significant events occurred that resulted in DOE's need to take action in response to the Cerro Grande Fire (Appendix A). On the evening of May 4, 2000, employees of the Department of the Interior, National Park Service, Bandelier National Monument, ignited a prescribed burn in a forested area within the boundaries of Bandelier National Monument along a mountain slope of the Cerro Grande. This fire was quickly pushed by winds outside the boundaries of the prescription area and was declared by the National Park Service to be a "wildfire" on May 5, 2000. The fire spread rapidly in a generally northeastern/eastern direction across land administered by the Department of Agriculture, Forest Service, Santa Fe National Forest. Starting late on May 7, through May 8 and 9, while winds were somewhat moderate, shrubs and trees were cut and back fires were ignited in an effort to hold the fire line at New Mexico State Road (SR) 501, which is located at the northwestern side of LANL. A very narrow strip of land a few hundred feet wide within that back fire area is administered by DOE as a part of LANL. The wind speed increased dramatically on May 10, 2000, and spread embers over a mile in advance of the wildfire fronts and well beyond the established fire lines, igniting forested areas within the heart of LANL and residential areas within the Los Alamos townsite located nearby. From May 10 until about May 17, the fire burned within LANL and the townsite area (Photo 1.1) before it was stopped and considered contained. In the wake of this fire, about 43,000 ac (17,200 ha) of forest burned along the mountain flanks within, above, and to the north of LANL. Over 200 residential units occupied by over 400 families burned within the Los Alamos townsite (Photo 1.2).

[1] This number of acres is an estimate based on data derived from the Burned Area Emergency Rehabilitation (BAER) Team Report (BAER 2000). It does not include DOE administered lands in Rendija Canyon since these are not part of LANL. Any differences in acres affected among the BAER Report, other published sources, and this document are the result of data entry variations or rounding differences and are not intended to indicate significant differences.

The Cerro Grande Fire resulted in more property loss than any other wildfire in New Mexico's recorded history. This fire also consumed enough forest acreage to make it the second largest wildfire in New Mexico's recorded history. As a result of this wildfire event, DOE identified the need to take actions on an emergency basis to protect human life and property. DOE considered that its actions should not just be protective of the lives of its employees, contractors, and subcontractors, but also the lives of all people living and working in the LANL region. DOE also considered that its actions should not just protect property belonging to the U.S. Government, but also the properties of neighboring and downstream landowners and residents. These end goals were approached through direct fire suppression and fire control actions; through the subsequent restoration of LANL facilities and structures to accommodate the resumption of human occupancy; and through a wide variety of actions undertaken to reduce the potential for significant storm water flood damage, including revegetation efforts and the development of constructed storm water control features. This SEA discusses all of these actions in detail in later sections.

1.1.2 Regulatory Framework

DOE would normally prepare an environmental impact statement (EIS) in compliance with the *National Environmental Policy Act of 1969* (NEPA), as amended, to analyze potentially significant beneficial or adverse impacts that could occur if a proposed action(s) was implemented. A draft EIS would be issued for stakeholder and public review and comment pursuant to the Council on Environmental Quality's (CEQ's) NEPA Implementing Regulations (40 CFR Parts 1500–1508) and DOE's NEPA implementing regulations (10 CFR Part 1021). After DOE received and incorporated comments, DOE would issue a final EIS, followed no sooner than 30 days later by a record of decision (ROD). This EIS process takes DOE an average of about 30 months to complete.

However, because of the urgent nature of the actions required of DOE to address the effects of the Cerro Grande Fire as it burned over LANL and the need for immediate post-fire recovery and protective actions, DOE had to act immediately. DOE was, therefore, unable to comply with NEPA in the usual manner. DOE thereby invoked the CEQ's emergencies provision of its NEPA Implementing Regulations (40 CFR Part 1506.11) and the emergency circumstances provision of DOE's own NEPA implementing regulations (10 CFR Part 1021.343(a)). Pursuant to those provisions, DOE consulted with the CEQ in May and early June about alternative arrangements with regard to NEPA compliance for its emergency actions. Consistent with agreements reached during those consultations (see Appendix A), DOE has prepared this SEA of known and potential impacts from wildfire suppression, post-fire recovery, and flood control actions as part of the alternative arrangement contemplated by the CEQ regulation. Additionally, on June 21, 2000, DOE published a Federal Register notice (see Appendix A) in which DOE disclosed the actions it had taken and foresaw taking, together with its intention to prepare this SEA and its estimate of potential impacts (as they were understood at the time). DOE also used that Federal Register notice to issue a public notice and statement of findings regarding DOE's intention to take action involving construction and other activities within floodplains and wetlands pursuant to

DOE's regulations for Compliance with Floodplains/Wetlands Environmental Review Requirements (10 CFR Part 1022). DOE did not receive any comments on the notice.

1.1.3 Public Involvement

Public involvement for the alternative arrangements included public and stakeholder meetings, informational announcements and fact sheets, newspaper articles, and web site postings. Three public and stakeholder meetings were held by the Forest Service at which technical specialists discussed fire related issues of concern with the public that included regulatory compliance issues. These meetings were held on June 1, 2, and 7, 2000, at Los Alamos, Santa Clara Pueblo, and San Ildefonso Pueblo. At those times, DOE announced its discussions with the CEQ and its proposal to issue an SEA as part of its alternatives arrangements for NEPA compliance with regards to its fire suppression actions taken and other anticipated connected actions. Public meetings were held by DOE in Los Alamos for the purpose of discussing with and updating the public and stakeholders on actions taken and actions planned at LANL on a weekly basis beginning on June 30 and continuing through August 11, 2000. The first three meetings were broadcast live over a local AM radio station (KRSN) that serves the Los Alamos County area. Similar monthly meetings will be held beginning on September 15, 2000, and continuing through the end of the year or beyond as needed. A Public Advisory Group was also established that focuses specifically on communications issues as they relate to potential runoff and flood mitigation activities. DOE has also provided information about its NEPA compliance process in meetings with the local Pueblo tribal leaders, and in notification letters regarding the SEA preparation sent to the State, pueblos and tribes, and other various identified interested parties. A link to the Federal Register notice is also posted on the DOE NEPA internet website and on the LANL website under "Cerro Grande Fire Info" (the UR is http://www.lanl.gov/labview/).

Upon issuance of the SEA, DOE will distribute the document to stakeholders and members of the public, make the document available at local public DOE reading rooms, and will place the document on the internet websites noted above. An announcement of its availability will be made in local newspapers and will be broadcast by KRSN. Meetings with the governors of the four Accord Pueblos[2] are planned to discuss the SEA and further mitigation measures in late September and early October 2000. The monthly DOE hosted public meetings in September and October will provide the public with information of the SEA's availability and provide an opportunity to comment on mitigation measures proposed and to suggest other additional measures for DOE's consideration.

The SEA encompasses the time from the initiation of fire control measures in the first week of May 2000 until the end of November 2000. The reason for the extended activity time frame is that rain typically falls in Los Alamos County from about June through

[2] Accord refers to the written agreements signed by DOE and the Jemez, Cochiti, Santa Clara, and San Ildefonso Pueblos on December 8, 1992, stating the basic understanding and commitments of the parties and describing the general framework for working together. Subsequently, cooperative agreements between each Pueblo and DOE, and between each Pueblo and the UC have been signed, which specify further details related to the accord agreements.

October, with over half of the annual rainfall amounts usually occurring during the months of July and August. Depending upon actual weather conditions, the completion of some of the activities planned for wetland and floodplain locations might be delayed until the rainy season has abated and site conditions allow the work to proceed to completion. Additionally, after review of actual rain conditions, some additional work may be required to prepare the LANL facility for subsequent seasonal precipitation.

1.2 Cerro Grande Fire Effects and Risks

LANL is a federal facility employing about 12,000 persons in northern New Mexico and comprising about 27,690 ac (11,076 ha) that is administered by DOE. It is located in north-central New Mexico on the Pajarito Plateau in a region characterized by forested areas with mountains, canyons, and valleys, as well as diverse cultures and ecosystems. The Pajarito Plateau is a volcanic shelf on the eastern slope of the Jemez Mountains at an approximate elevation of 7,000 feet (ft) (2,100 meters [m]). This plateau is dissected by 13 steeply sloped and deeply eroded canyons that have formed isolated finger-like mesas oriented in a west to east direction. Land management practices employed by the various land stewards in the vicinity of LANL during the last 50 years have been characterized by severe reductions in cattle grazing and timber cutting in the area, as well as by artificial (institutionalized) fire suppression efforts. The most obvious effects of these practices have been an intense increase in overall tree stand densities, tree continuity, and overall fuel loading within the forested areas, with a corresponding decrease in understory ground cover. The heavily forested areas within and surrounding LANL before the Cerro Grande Fire were generally overgrown with dense stands of unhealthy trees with excessive amounts of standing and fallen dead tree material. Over the past decade, local community leaders and government land stewards have recognized that forest conditions presented an extreme wildfire hazard to LANL, to Los Alamos County residents (nearly 18,000 people), and to other nearby land owners, residents, and communities. Adequate funding and other resources, however, were not available to agencies and individuals to immediately alleviate this hazard.

The Cerro Grande Fire created large areas of burned vegetation, including areas of bare ash along the steep slopes and canyon sides above and within LANL (Photo 1.3). Areas within the fire's perimeter burned with high, moderate, and low severities (Figure 1.3). Burn severity is a relative measure of the degree of change in a watershed that relates to the severity of the effects of the fire on watershed conditions. About 34 percent of the total area burned by the Cerro Grande Fire burned at a high-burn severity (Photo 1.4), and about 8 percent burned at a moderate-burn severity (Photo 1.5). Additionally, about 58 percent burned at a low-burn severity (Photo 1.6) or was skipped over by the flames leaving "islands" of green vegetation within the overall perimeter of the burned area. Most LANL acreage burned with a low-burn severity, with only small areas of high-burn severity and moderate-burn severity. Specifically, about 88 percent of the LANL area that burned did so with low-severity consequences, 11 percent with moderate severity, and less than 1 percent with high-severity results. The vegetation mortality

classifications[3] generally correspond with the levels of burn-severity ratings. Overall, the surface soil properties on sites with high-burn severity were altered. The soil structure broke down and a hydrophobic layer that resists water penetration was established. These characteristics allow for rain-impact surface soil erosion, reduced water infiltration into the soil, and a severe increase in soil erosion and runoff during storm events. Similarly, areas with a moderate-burn severity have potential for additional soil erosion above their pre-burn soil erosion rates. Seed resources are adversely affected by high- and moderate-burn severity fires, which may impede the ability of vegetation to be naturally restored after a fire.

Post-fire conditions present along the hills and ridges at elevations above LANL, as well as within LANL, pose a very high risk for erosion and flood damages at the LANL facility and to nearby residential communities downstream all the way to the Rio Grande. This high risk for flooding also exists for Los Alamos townsite located north of LANL, as well as for Pueblo lands and residences located downstream of the townsite. Seventy-seven potential contaminant release sites (PRSs) and two nuclear facilities at LANL that contain hazardous and radioactively contaminated soils and materials are located within floodplain areas. Without DOE action, these PRSs and nuclear facilities have the potential to release contaminants and materials downstream. Numerous cultural resources sites and traditional cultural properties (TCPs) are located in canyon areas or along drainages. These sites are now at increased risk of flood damage. Each canyon also provides potential habitat for federally-listed threatened and endangered (T&E) species, which could be affected as well. Canyon storm water discharge flow measurements for a six-hour storm event with a once-in-100-year return rate at LANL typically are in the range of about 35 to 590 cubic feet per second (ft^3/s) (1.05 to 17.7 cubic meters per second [m^3/s]); post-fire modeling estimates the canyon discharge flows (before rehabilitation work) to be in the range of 90 to 3,276 ft^3/s (2.7 to 98.3 m^3/s) for the same duration storm events. Some canyons are expected to have even greater flow amounts over some areas because of location-specific site conditions after the fire. While the rehabilitation actions (e.g., raking, seeding, and mulching) undertaken by the Forest Service on the forests above LANL may reduce the severity of floods onto LANL, the actions are only expected to maximally reduce the storm water discharge onto LANL by about 30 percent during the first year after the fire (BAER 2000). The potential for flooding onto and across LANL will exist for the next several years to decades in some locations until enough vegetation is established to cover the hillsides and canyons to act as a sufficient deterrent to the soil erosion and flooding threat.

1.3 Purpose of This Document and Related NEPA Analyses and Other Documents

This SEA provides the reader with an assessment of the impacts that have resulted because of actions undertaken by DOE (or undertaken on the behalf of DOE by other parties at DOE's direction or with DOE funding) to address a major disaster emergency situation. The SEA describes the actions, identifies impacts resulting from the actions,

[3] Vegetation mortality classifications (BAER 2000:371) were developed to quantify impacts to vegetation: Class 1: 0 – 10 percent vegetation mortality, Class 2: 10 – 40 percent vegetation mortality, Class 3: 40 – 70 percent vegetation mortality, Class 4: 70 – 100 percent vegetation mortality.

describes mitigation measures taken that render impacts of these actions not significant or that lessen the adverse effect of the actions, and analyzes cumulative impacts.

Decisions to undertake actions were made by DOE through a working team known as the LANL Emergency Rehabilitation Team (ERT). The ERT consists of DOE and teams from both the University of California (UC) (as the management and operations contractor for LANL) and the U.S. Army Corps of Engineers (USACE), working jointly in support of DOE. USACE worked under an Interagency Agreement (DEAI04-00AL79799) with DOE to construct engineer-designed storm water structures in the field. The ERT evaluated and estimated the impacts from the Cerro Grande Fire; identified and designed appropriate mitigation measures for increased erosion, storm water runoff, and potential flood conditions; and implemented these measures to prevent further damage to people, property, and the environment. The ERT selected a subset of the actions discussed in the June 21, 2000, Federal Register notice (see Appendix A) for implementation. A written plan, the LANL Emergency Rehabilitation Project Plan (the Plan) was first issued on July 7, 2000, (LANL 2000a) and subsequently updated on August 11, 2000.

A range of data points and prediction models were used to assist the ERT in reaching decisions regarding actions to be implemented at LANL. At first, decisions were made largely based on recommendations from the Forest Service's BAER Team (BAER 2000). The BAER Team is a multidisciplinary team experienced in fire recovery planning and in implementation of erosion and flood control measures. As data and information became available or were developed, the ERT used predictive modeling specific to the LANL site in the ERT decision process. Decisions were reached regarding the larger engineered structures after weighing the advantages and disadvantages of several technical and locational alternatives as well as the alternative of not taking any action within specific canyon reaches. These decisions took into account a variety of different factors, including cultural resource locations; T&E species potential habitat conditions; PRSs; information on contaminants within canyon reaches; potential storm water flow rates; canyon contours and land form conditions; potential silt and debris flow accumulations; implementation time and difficulties; engineering uncertainties; water quality estimates downstream from LANL; and other factors, including costs. Actions undertaken through the ERT have been coordinated with the four Accord Pueblos and federal, state, and local stakeholders, including the U.S. Department of the Interior (National Park Service and Bureau of Land Management); U.S. Department of Agriculture (Forest Service); the Environmental Protection Agency (EPA); the Federal Emergency Management Agency; the State of New Mexico (Department of Health, Engineer's Office, and Environment Department [NMED]); and the Incorporated County of Los Alamos, Santa Fe County, and other surrounding counties. In some cases, DOE modified possible actions based upon information or concerns expressed by one or more of these parties. Actions included in the Plan have for the most part already been completed or are underway and will be completed soon.

Unlike an EIS produced in the course of routine NEPA compliance, this SEA does not include an impact assessment of alternative actions that DOE could have taken to meet its purpose and need for action. Nor does it include an assessment of the No-Action

Alternative. Furthermore, DOE will not issue a formal ROD based on this SEA analysis. Actions not included in this SEA will be the subject of other NEPA reviews and analyses. Specifically, certain actions (such as replacement of experimental equipment and construction of a new emergency operations center building) are expected to be proposed soon that may in some way relate to the Cerro Grande Fire event, but which are not necessary for the immediate protection of human life or property. DOE has adequate time in which to undertake the routine NEPA compliance process for these proposals.

This SEA does not include an analysis of the impacts that resulted from the Cerro Grande Fire itself. Fire impacts at LANL are to be documented in other reports. A special edition of the LANL Site-Wide Environmental Impact Statement (SWEIS) Yearbook entitled *Wildfire 2000* (LANL 2000b), was issued recently by UC (LA-UR-00-3471; http//lib-www.lanl.gov/la-pubs/00393627.pdf). This document compares the postulated accident analysis provided in the 1999 LANL SWEIS (DOE 1999) with the actual wildfire. Future issues of the LANL SWEIS Yearbook will include information and updates on the impacts of the fire and changes to the ecological setting at LANL, as well as cumulative fire effects information. Pursuant to DOE's NEPA implementing regulations (10 CFR Part 1021.330 (d)), DOE will evaluate the 1999 LANL SWEIS in or before 2004, by means of a supplement analysis to determine if the existing EIS remains adequate or whether to prepare a new SWEIS or supplement the existing EIS, as appropriate. The effects of the Cerro Grande Fire will be considered in this five-year evaluation process for the SWEIS. Also, the BAER Team published a rehabilitation plan in June 2000, the *Cerro Grande Fire Burned Area Emergency Rehabilitation Plan* (BAER 2000), which included information on the effects of the fire, the risks of future flooding downstream along the canyons trending across the Cerro Grande Fire burned area, and recommended storm water control measures. The initial fire rehabilitation efforts for all the involved government agencies with lands affected by the Cerro Grande Fire were coordinated by the BAER Team. This rehabilitation plan presents only limited and preliminary information about the fire's specific effects on LANL and about the fire suppression actions taken there. The BAER Team plan also presents limited information on the potential erosion and flooding risks at LANL and the storm water control measures to be implemented. The BAER Team did not focus its efforts on LANL because of its lack of experience with facilities that involve the use or storage of radioactive materials and with facilities that have radioactively contaminated PRSs in the environment. Another report that will include information and analysis of the impacts of the Cerro Grande Fire is the LANL *Environmental Surveillance and Compliance at Los Alamos During 2000.* This annual report will include information about the fire and subsequent environmental changes that result to the various media included by the surveillance and compliance program.

Resource management plans produced by DOE and UC over the next five years will include information about the Cerro Grande Fire. Management plans recently implemented or under development at the time of the Cerro Grande Fire are being revised to include the effects of the Cerro Grande Fire on their respective resources. These include plans required by the DOE's Dual-Axis Radiographic Hydrodynamic Test (DARHT) Facility EIS and the SWEIS Mitigation Action Plans (such as the Threatened

and Endangered Species Habitat Management Plan and the Cultural Resources Management Plan).

Other related NEPA compliance documents will discuss aspects of the existing post-fire environment. DOE recently issued a final environmental assessment (EA) and finding of no significant impact on its proposed Wildfire Hazard Reduction and Forest Health Improvement Program for LANL on August 10, 2000. In late 1999, DOE notified LANL stakeholders, including local pueblos and tribes and various identified interested parties, of its intent to prepare an EA for a proposed wildfire hazard reduction program at LANL. This draft EA was scheduled for release to stakeholders and the public for review during the week of May 8, 2000; however, with the advent of the Cerro Grande Fire, this draft document was not released as scheduled. After the Cerro Grande Fire was contained within LANL, DOE revised the draft EA to include the effects of the fire and finally issued the draft EA in July 2000. This long-term management program will allow DOE to thin forest vegetation to an appropriate level and then maintain it at that level to accomplish both the reduction of wildfire hazards and to improve the overall health of the forest resources at LANL. This EA did not include the analyses of any of the environmental impacts resulting from DOE's emergency actions that are the subject of this SEA.

Similarly, DOE is preparing an EIS for the proposed relocation of the mission and operations currently conducted at LANL's Technical Area (TA) 18 (Figure 1.4). This EIS also will not include the analyses of any of the environmental impacts resulting from DOE's emergency actions that are the subject of this SEA. TA-18 is one of the two nuclear facilities noted previously that is located within a LANL floodplain. DOE issued a Notice of Intent to prepare this EIS in the Federal Register on May 2, 2000, and scoping meetings were held at various locations later in May 2000. The draft EIS is scheduled to be issued for stakeholder and public review and comment in late 2000; and the final EIS is also scheduled for 2000. DOE expects to issue a ROD in 2001. This SEA will only consider the impacts of moving materials around TA-18 to position them in safer locations within the TA to protect them from the possible effects of site flooding. The EIS will focus on the analyses of impacts associated with upgrading existing facilities at TA-18 and moving the TA-18 mission operations elsewhere at LANL or to another of DOE's nuclear complex facilities.

This SEA also does not address the potential impacts that could result from erosion and floods at LANL should these occur beyond the design function of the engineered structures installed at LANL and analyzed herein. In the event of such a flood(s), DOE will undertake action and compliance with NEPA and other applicable environmental laws as appropriate. Documentation necessary will be prepared as needed at the time of that event.

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